

Lumina

An Honors Thesis (HONRS 499)

By

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Abstract

For my thesis I chose to produce a short DVD of computer animation. The centerpiece of this DVD is a computer-animated short, roughly three and a half minutes in length. The DVD also contains special features detailing the process of computer animation from the initial concept and outline of the feature through all the steps necessary to produce a finished animation.

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Artist's Statement

In the initial phases of the outlining of the main feature of this DVD my main concerns were of a technical, rather than aesthetic nature. Thus, the plot of the story was built around those factors. I wanted to delve further into character animation than I had in the past, so I included a human character in my initial concepts. I also wanted to explore animating interactions between multiple characters, as well as animating non-human characters, so created a non-human antagonist and decided the animation would center on a conflict between these two. With a central plot established, I then decided what other technical aspects to explore, and chose computer simulation as a primary concern. There are a variety real-world phenomena computer animation can simulate, but I decided that fabric and fluid simulation would provide a good challenge. Based on that I decided to give the protagonist a flowing robe-like costume to better show the cloth simulation, and whichever character was defeated should be beheaded to provide an inlet for the fluid simulation through blood. After all these factors were considered and turned into a final plot outline, I proceeded to storyboard the entire sequence and begin the animation.

As producing a computer animation is an extremely lengthy and involved process, especially for a single person, I decided to document some of the most involved and technical portions to give someone who is not familiar with the process an idea of how much work goes into even the shortest animated pieces. In traditional filmmaking there is a great deal of resources to begin with, such as locations, props, and even actors. In computer animation, everything that appears on screen must be produced in a virtual environment from scratch, and often in exacting detail. This process includes initial concept sketches to decide what various elements are going to look like, as well as work out any compositional problems that may arise. Then digital models are produced, as well as flat color images called texture maps which are then applied to the model to make it look more realistic. Any object that is going to be animated must then be rigged with something akin to a skeleton, which defines how it will move and bend, and the skeleton itself is then animated to produce the final motion of the character. Once all the animation is completed, the computer must then simulate any part of the animation that is not actively animated, such as the cloth and fluid. Finally, every shot of the animation must be rendered by the computer, pixel by pixel, to produce a nearly photo-realistic image. Time is a major concern in rendering the final animation, as any single frame can take up to an hour to render, and in even a three and a half animation there are over 5000 frames to render. Had this final animation been executed on a single computer rather than over 20, it would have taken roughly one hundred days just to render.